

OCEAN DUMPING IN THE UNITED STATES

Sixth Annual Report of the Environmental Protection Agency on Administration of Title I

**Marine Protection, Research, and Sanctuaries
Act of 1972, as amended**

January-December 1977



**U.S. ENVIRONMENTAL PROTECTION AGENCY
Washington, D.C. 20460**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

JUL 12 1978

THE ADMINISTRATOR

Honorable Walter F. Mondale
President of the Senate
Washington, D.C. 20510

Dear Mr. President:

Section 112 of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended, requires the Administrator of the Environmental Protection Agency (EPA) to submit an annual report on the administration of the ocean dumping permit program authorized under Title I of the Act. The sixth annual report for this program is transmitted with this letter.

The ocean dumping permit program became effective April 23, 1973, and final regulations and criteria were published October 15, 1973. Revisions to those regulations and criteria were published on January 11, 1977. This report covers activities during calendar year 1977.

The dumping into ocean waters of all materials is regulated by EPA permits except dredged materials, for which the U. S. Army Corps of Engineers issues permits. We believe that the permit program has brought the previously unregulated practice of ocean dumping under strict control.

Sincerely yours,



Douglas M. Costle

Enclosure



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

JUL 12 1978

THE ADMINISTRATOR

Honorable Thomas P. O'Neill, Jr.
Speaker of the House
of Representatives
Washington, D.C. 20515

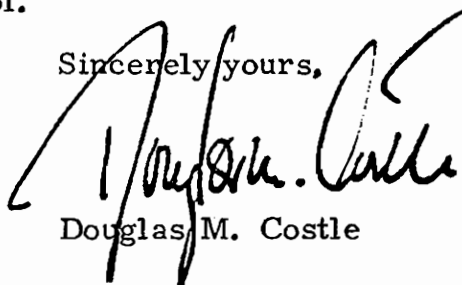
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INTRODUCTION AND SUMMARY

This is the Environmental Protection Agency's (EPA) sixth annual report to the Congress on the implementation of Title I of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended (MPRSA). The report covers the Agency's authorities and responsibilities in carrying out the ocean dumping program and reviews those program activities conducted within EPA Headquarters, the Regions, and the Office of Research and Development during the calendar year 1977.

Three other agencies having responsibilities under the MPRSA, the U. S. Army Corps of Engineers, the U. S. Coast Guard, and the National Oceanic and Atmospheric Administration, will each submit separate reports on their activities in implementing the Act. Therefore, this report does not contain a discussion of their activities under the Act except as they impact the responsibilities of EPA.

During 1977, the amount of ocean dumping declined by 12 percent from the level of dumping in 1976. Region II (New York) continues to be the most active area, with approximately 7,300,000 tons of materials dumped in and adjacent to the New York Bight and off the coast of Puerto Rico under permits issued for municipal and industrial wastes, construction debris, and incineration of wood debris. In the Permit Program section, Table V summarizes the total amount of dumping during 1977 (by geographic area) and presents an annual comparison of amounts dumped under EPA permit during preceding years.

A summary of information on ocean dumping permits issued by Contracting Parties to the International Ocean Dumping Convention is included in the section discussing the deliberations of the Convention. Accomplishments are being made in establishing agreements on major items of high priority of work in clarifying the provisions and requirements of the Convention.

A joint EPA-U. S. Air Force project on incineration at sea of Herbicide Orange was successfully completed during August and September 1977. A brief description of the project is included in the section on Incineration at Sea, and a detailed report is being prepared for publication in the near future.

OCEAN DUMPING PROGRAM CHRONOLOGY FOR 1977

- | | | |
|----------|-----------|--|
| January | 7 | Court Hearing on City of Camden N. J.
Emergency Ocean Dumping Permit--Camden
agrees to move to 106-mile site |
| | 11 | Final Revision of Ocean Dumping Regulations
and Criteria published in Federal Register |
| February | 8 | Final EIS issued on Proposed Revisions to Ocean
Dumping Criteria |
| March | 4 | Meeting of Interagency Ocean Dumping Coordinating
Committee, Washington, D.C. |
| | 9 | House Merchant Marine and Fisheries Committee
Oversight Hearings, Washington, D.C. |
| | 9 | U.S. Air Force request to reconvene Public Hearing
on permit application for incineration at sea of
Herbicide Orange |
| | 10 | Public Hearing, Region II, municipal sludge Ocean
Dumping Permit, Camden, New Jersey |
| April | 7 | Public Hearing, Headquarters, U.S. Air Force
application for incineration at sea of Herbicide
Orange, Washington, D.C. (Reconvened from
1975) |
| | 25 | Research Permit issued to U.S. Air Force for inciner-
ation at sea of Herbicide Orange stocks located at
Gulfport, Mississippi |
| May | 2 | Designation in Federal Register of incineration at sea
site in the Pacific Ocean |
| | 19 | Completion of incineration at sea of Shell Chemical
Company organochlorine wastes under Special
Permit on Board M/T Vulcanus (Burn March-May) |
| | 25 | Public Hearing, Region II, on 14 municipal sludge,
2 wood incineration, 1 industrial Ocean Dumping
Permit applications, New York City |
| | 31
and | Public Hearing, Headquarters, to consider
possible relocation of sewage sludge dump sites
in Atlantic Ocean, Toms River, New Jersey |
| June | 1 | |

- November 1 Public Hearing, Region II, on 8 industrial Ocean
Dumping Permits, Puerto Rico
- 4 Signed into law - P. L. 95-153, extends authorization
for Marine Protection, Research, and Sanctuaries
Act, and calls for ending the dumping into ocean
waters, after 1981, of sewage sludge which "may
unreasonably degrade or endanger human health,
welfare, amenities, or the marine environment,
ecological systems, or economic potentialities"
- 28 Publication in Federal Register of interim final
revisions to Ocean Dumping Regulations,
Part 223 (Contents of Permits), and Part 226
(Enforcement)

Title II requires the National Oceanic and Atmospheric Administration (NOAA) to conduct a comprehensive program of research and monitoring regarding the effects of the dumping of material into ocean waters. Title III gives NOAA the authority to establish marine sanctuaries.

Amendment in 1977

During 1977, PL 95-153 amended the MPRSA to require the cessation of the ocean dumping of sewage sludge as soon as possible and in any event no later than by December 31, 1981. For the purposes of this amendment, the term "sewage sludge" means any solid, semisolid, or liquid waste generated by a municipal wastewater treatment plant the ocean dumping of which may unreasonably degrade or endanger human health, welfare, amenities, or the marine environment, ecological systems, or economic potentialities. This makes the 1981 phase out date statutory for sewage sludge (as defined in the amendment) dumped under interim permits as incorporated in the final revision of the EPA ocean dumping regulations.

Any wastes from a municipal wastewater treatment plant that can meet the EPA environmental impact criteria for ocean dumping are not precluded by the amendment. However, at this time it is not feasible to treat such wastes to the extent that they would no longer be classified as sewage sludge according to the definition given in the amendment. Therefore, this amendment will bring about the termination of all ocean dumping of sludges from municipal wastewater treatment plant discharges by the end of 1981.

This amendment was stimulated by congressional concern that those municipalities currently dumping sewage sludge in the ocean were not moving rapidly enough toward implementing alternatives which would permit them to stop ocean dumping as soon as possible and that a statutory requirement would provide an additional incentive to accomplish this.

Relationship Between the Resource Conservation and Recovery Act of 1976 (RCRA) and the MPRSA

Implementation of RCRA (Amendment of the Solid Waste Disposal Act), in combination with the Clean Air Act, the Clean Water Act (CWA) and with the MPRSA, represents major steps taken by EPA towards total environmental protection.

RCRA includes the management of hazardous wastes from the cradle to the grave, i. e., from the generator to the treatment facility, to the storage facility, and to the disposal facility. Under this, in theory,

INTERNATIONAL OCEAN DUMPING CONVENTION

The Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matter (Ocean Dumping Convention) was negotiated in London in November 1972, and came into force on August 30, 1975, following receipt of the requisite 15 ratifications or accessions. A First Meeting of Contracting Parties was held in London on December 17-18, 1975, for the primary purpose of designating an organization to serve as the Secretariat. The Intergovernmental Maritime Consultative Organization (IMCO) was so designated.

Recognizing the importance of this treaty and U.S. contributions to its deliberations, the U.S. Department of State established the Committee on Ocean Dumping, a sub-committee of the Shipping Coordinating Committee, to insure coordination between government agencies and provide for public comment on U.S. positions regarding implementation of the Convention. The Committee is chaired by EPA, and membership is comprised of representatives from 14 government agencies and 15 non-government organizations.

The Committee was first convened in March 1976. During a meeting in September 1976, review and comments were made on the proposed U.S. positions regarding the agenda items of the First Consultative Meeting of Contracting Parties. The Committee is advised on the deliberation and results of the Convention, and continues to serve in an advisory capacity for future Consultative Meetings.

The First Consultative Meeting of Contracting Parties met at IMCO Headquarters in London on September 20-24, 1976. Participation included representatives from 14 of the 29 Contracting Parties, 22 observer States which had not yet ratified or acceded to the Convention, observers from eight intergovernmental organizations, and representation from one non-governmental organization. The Meeting achieved agreement on Rules of Procedure, on Form and Manner of Notification (reports of ocean dumping permits) required by the Convention, and the need to develop international guidelines to regulate incineration at sea. Areas of high priority established for future work included definition of high level radioactive waste, procedures for settlement of disputes, and interpretation of terms (e.g., trace contaminants) appearing in the Annexes of the Convention.

An intersessional Consultation on Incineration at Sea took place in London during March 1977. Experts from six Contracting Parties, including the U.S., met to consider the technical aspects of incinera-

TABLE I

Governments Which Have Ratified or Acceded
to the Ocean Dumping Convention
as of September 1977

Afghanistan	Kenya
Byelorussian SSR	Libyan Arab Jamahiriya
Canada	Mexico
Cape Verde	Monaco
Chile	Morocco
Cuba	New Zealand
Denmark	Philippines
Dominican Republic	Spain
France	Sweden
German Democratic Republic	Tunisia
Guatemala	Ukrainian SSR
Haiti	United Arab Emirates
Hungary	United Kingdom
Iceland	United States
Jordan	USSR
Nigeria	Yugoslavia
Norway	Zaire
Panama	

THE PERMIT PROGRAM

Permitted Dumping During 1977

The Ocean Dumping Permit Program became effective on April 23, 1973; the final Ocean Dumping Regulations and Criteria were published in October 1973. Significant revisions to the Regulations and Criteria were finalized and published in January 1977. Revisions to the Procedural portions of the Ocean Dumping Regulations (Parts 223 and 226) were published on November 28, 1977.

General Permits may be issued for dumping of small quantities of material which will have a minimal adverse environmental impact when dumped under prescribed conditions. Examples include burial at sea of human remains or ashes, transportation of target vessels with the intent of sinking the vessels during ordnance testing, and transportation and disposal of derelict vessels, particularly when they pose a threat to navigation.

Special Permits may be issued for the dumping of materials which satisfy the Criteria, but only for a maximum duration of three years for each permit. In 1977, Special Permits were issued for incineration at sea of Herbicide Orange, for disposal of construction rubble and demolition debris, and for the dumping of certain aqueous dye production wastes and miscellaneous laboratory wastes.

Emergency Permits may be issued for disposal of materials which pose an unacceptable risk relating to human health and for which there is no other feasible solution. No Emergency Permits were issued during 1977. Although several instances occurred which might have warranted an Emergency Permit, acceptable alternative means of disposal were used in each case.

Interim Permits may be issued for a period not to exceed one year until December 31, 1981, for dumping materials which are not in compliance with the environmental impact criteria or for dumping at a dump site designated only as interim approved. However, no Interim Permit will be issued for dumping of wastes from a facility which has not previously ocean dumped and, as of April 23, 1978, where the permit does not include a schedule which would allow implementation of an alternate disposal method or compliance with the criteria on or before December 31, 1981. Most of the current ocean dumping permits are Interim Permits, mainly because most dump sites are only interim sites and because some of the materials

The continued reduction in overall ocean dumping during 1977 is the result of the continuing EPA effort to require those permittees whose wastes are unacceptable for ocean dumping to seek alternative means of disposal as rapidly as possible. During 1977, 20 permittees were phased out of ocean dumping, increasing the number of permits denied or phased out since the inception of the program to a total of 168 (Table VI). The largest number of these were in Region II, where 7 industrial dumpers and 11 municipal dumpers were phased out (Table VII).

TABLE IV
PERMIT ACTIVITY - CALENDAR YEAR 1977

<u>Permittee; Location Type Permit</u>	<u>Material Dumped</u>	<u>Actual Quant. Dumped (1977)</u>
<u>Region I</u>		
Safety Products and Engineering; West Quincy, Mass.; special	alkali metals and explosives	38,800 lbs 860 lbs
<u>Region II</u>		
Bergen Co. Sew. Auth.; Little Ferry, N. J.; interim	sewage sludge	225,000 wet tons
Joint Meeting of Essex and Union Counties; Irvington, N. J.; interim	sewage sludge	86,000 wet tons
Linden Roselle-Rahway Valley Sew. Auth.; Linden, N. J.; interim	sewage sludge	227,000 wet tons
Middlesex Co. Sew. Auth.; Sayreville, N. J. interim	sewage sludge	305,000 wet tons
Middletown Twp. Sew. Auth.; Belford, N. J.; interim	sewage sludge	15,000 wet tons
Passaic Valley Sew. Comm.; Newark, N. J.; interim	sewage sludge	729,000 wet tons
City of Glen Cove; Glen Cove, N. Y.; interim	sewage sludge	6,000 wet tons
City of Long Beach; Long Beach, N. Y.; interim	sewage sludge	7,000 wet tons
Nassau Co. D. P. W. (8 plants); East Rockaway, N. Y.; interim	sewage sludge	378,000 wet tons
Westchester Co. D. E. F.; Yonkers, N. Y.; interim	sewage sludge	157,000 wet tons
West Long Beach Sew. Dist.; Atlantic City, N. J.; interim	sewage sludge	600 wet tons
New York City; N. Y.; interim	wood from repair of harbor facilities	1,700 dry tons (incineration)
American Cyanamid; Linden, N. J.; interim	manufacturing wastes, water treatment chemicals	143,000 wet tons
Allied Chemical; Elizabeth, N. J.; interim	by-product HCl from manufacturing process	32,000 wet tons

TABLE IV (CONT.)

<u>Permittee; Location Type Permit</u>	<u>Material Dumped</u>	<u>Actual Quant. Dumped (1977)</u>
General Marine Transport Corp.; Bayonne, N. J.; interim Domestic Septic Tank Wastes Montville Morris Twp. Wanaque S. A. Warren Twp. West Milford Wood-Ridge	sewage sludge and septic tank wastes	49,000 wet tons
Corps of Engineers; New York City, N. Y.; interim	driftwood, timbers and pilings from waterfront structures	13,400 dry tons (incineration)
PCI International; Arecibo, Puerto Rico; interim Bristol Alpha, Inc. Cyanamid Agric. de P. R. Merck Sharp & Dohme Pfizer-P. R. P. R. Olefins Co. Schering Corp. Upjohn Mfg. Co. Oxochem	waste from manufacture of pharmaceuticals, chemicals	314,000 wet tons
<u>Region III</u>		
City of Philadelphia; Philadelphia, Pa.; interim	sewage sludge	594,444 wet tons
<u>Region VI</u>		
Shell Chemical Co.; Deer Park, Texas; special	aerobically treated biosolids	60,192 wet tons
Shell Chemical Co.; Deer Park, Texas; special	organochlorine wastes	17,643 metric tons (incineration)
Ethyl Corp.; Baton Route, La.; interim	sodium-calcium sludge	860 tons
<u>Headquarters</u>		
U. S. Air Force Washington, D. C.; research and special	Herbicide Orange	12,112 wet tons (incineration)

TABLE V (CONT.)

WASTE TYPE	TOTALS OF A, B, AND C				
	1973	1974	1975	1976	1977
Industrial Waste	5,050,800	4,579,700	3,441,900	2,733,500	1,843,800
Sewage Sludge	4,898,900	5,010,000	5,039,600	5,270,900	5,134,000
Construction and Demolition Debris	973,700	770,400	395,900	314,600	379,000
Solid Waste	240	200	0	0	<100
Explosives	0	0	0	0	
Incinerated (Wood)	10,800	15,800	6,200	8,700	15,100
Incinerated (Chemicals)	0	12,300	4,100	0	29,700
TOTAL	10,934,440	10,388,400	8,887,700	8,327,700	7,401,600

TABLE VII

OCEAN DUMPING PERMITS PHASED OUT
OR DENIED BY EPA REGION II DURING 1977

<u>Company</u>	<u>Location</u>	<u>Date Phased Out or Denied</u>
J. T. Baker	Phillipsburg, N. J.	July 1977
IMC Chem. Gr.	Newark, N. J.	March 1977
Keuffel & Esser	Rockaway, N. J.	February 1977
Oxochem Enterprises	Penuelas, P. R.	August 1977
S. B. Penick	Montville, N. J.	December 1977
Lemming/Pacquin	Parsippany, N. J.	December 1977
Whippany Paper Board Co	Whippany, N. J.	May 1977
Montville Twp. MUA	Montville, N. J.	December 1977
W. Milford STP	W. Milford, N. J.	December 1977
Warren Twp. STP	Warren, N. J.	February 1977
Avon-by-the-Sea STP	Avon-by-the-Sea, N. J.	June 1977
Belmar STP	Belmar, N. J.	June 1977
Fairfield Boro STP	Fairfield, N. J.	February 1977
Matawan STP	Matawan, N. J.	July 1977
Spring Lake Heights STP	Spring Lake Heights, N. J.	July 1977
Wynnewood S. U. Co.	Freehold, N. J.	February 1977
** Jersey City S. A.	Jersey City, N. J.	November 1977
** Mayaguez Water Trmnt. Plant, Inc.	Mayaguez, P. R.	November 1977

** withdrawn application

To effectively implement the new criteria, new procedures dealing with the solid phases of wastes and dredged material had to be developed and the existing bioassay procedures had to be improved in order to provide better measures of the chronic toxic effects and bioaccumulation of certain constituents. The revised Ocean Dumping Regulations and Criteria state that an implementation manual describing the applicability of specific evaluative approaches and procedures would be developed jointly by EPA and the COE.

In July 1977, EPA and the COE published the manual "Ecological Evaluation of Proposed Discharge of Dredged Material Into Ocean Waters"--a multidisciplinary effort of both agencies to develop procedurally sound, routinely implementable guidance and procedures with which to evaluate the potential ecological effects of dumping of dredged material. The document is not intended to establish standards or rigid criteria and should not be interpreted in such a manner. It attempts to provide a balance between the technical state-of-the-art and routinely implementable guidance for using the procedures specified in the Ocean Dumping Criteria, and is intended to encourage continuity and cooperation between COE Districts and EPA Regions in evaluative programs for Section 103 permit activities.

Additionally, a revised manual covering procedures for other materials will be published in time to be used during the 1978 permit cycle. Both manuals present procedures resulting from recent research by EPA and COE scientists and represent the first attempt to apply benthic bioassays to an ocean pollution regulatory program. The bioassays contained in these manuals are to be run on the wastes and the dredged materials themselves, not on the individual constituents they contain. Thus, the results of these tests will show an integrated effect of the material as discharged, and will provide a more sensitive and realistic assessment of the actual ecological impact of the materials as dumped. The application of criteria based on these procedures will, in the long run, provide a higher degree of protection for marine ecosystems than has been possible in the past.

Research on all types of marine bioassays is continuing, and it is anticipated that these manuals will be revised as more research is completed and more information is derived from operational activities.

ENFORCEMENT

Surveillance and enforcement activities to prevent unlawful transportation of materials for dumping and assure compliance with ocean dumping permit conditions are the responsibility of the U. S. Coast Guard.

The Ocean Dumping Regulations require permittees to give authorities advance notification prior to commencing any dumping operations. The Coast Guard conducts surveillance of the operations by several methods, including vessel or aircraft escort or interception of dumper vessels, in-port boarding and inspection, shipriders on board to observe dumping operations, and vessel traffic system (VTS) radar. Operational testing of a recently developed electronic recording device, the Ocean Dumping Surveillance System (ODSS), is expected to run until May 1978. Future plans call for the installation on board dumping vessels of operational systems commencing in 1978.

During 1977 the Coast Guard received 5,116 notifications from permittees for intended ocean dumping--330 for mixed industrial wastes and 4,786 for other permitted wastes. A total of 1,291 surveillance missions were conducted--238 on dumps of industrial waste and 1,053 on dumps of other wastes, representing respectively a 72 percent and 22 percent Coast Guard surveillance coverage for the two categories of wastes. The missions were accomplished by the following methods: 190 by vessels, 927 by aircraft, 156 by shipriders, 17 by VTS radar, and 1 by ODSS during testing.

In addition to Coast Guard surveillance, alleged violations are also detected by EPA and occasionally reported to EPA by other organizations and private citizens. All alleged violations of ocean dumping are reported to the appropriate EPA Regional Offices.

In calendar year 1977, the Coast Guard referred to EPA Regional Offices 35 cases that involved 226 alleged violations which included, among others, 126 for dumping at an improper dispersal rate, and 77 for failure to provide proper notification. The Regional Office follows up on all reports and investigates each case. Letters of warning are sent in many cases for failure to notify in advance of dumping. In cases where other violations are substantiated, notices are issued and procedures taken under EPA enforcement regulations.

Table VIII identifies enforcement actions taken by EPA during 1977 and the disposition of each case. Also included are several cases for which action had been pending from a previous year and final disposition occurred in 1977.

<u>ORDER NO.</u>	<u>RESPONDENT'S NAME</u>	<u>REFERRAL FROM</u>	<u>TYPE OF VIOLATION</u>	<u>NOTICE OF VIOLATION</u>	<u>DISPOSITION</u>	<u>DISPOSAL SITE</u>
77-4	International Liquors, Inc.	USCG	Dumping without permit	3/15/77	Final Order-1/31/78 Reprimand	Virgin Islands
77-5/11	General Marine	USCG	Dumping at a faster rate and over a shorter distance than permitted	3/22/77 & 5/11/77	Pending	Sewage sludge
77-12	Not issued					
77-13	New York City Dept. Water Resources	USCG	Failure to maintain facilities in good working order	8/17/77	Pending	Sewage sludge
77-14	Westchester Co. & McAllister Bros.	USCG	Dumped outside authorized dump site	8/18/77	Final Order-1/30/78 Charges withdrawn	Sewage sludge
77-15	A&S Trans. Co., Ocean Disposal Co., & McAllister Bros.	USCG	Dumped outside authorized dump site	8/18/77	Final Order-1/31/78 Charges withdrawn	Sewage sludge
<u>Region III</u>						
	City of Philadelphia	EPA	Failure to adhere compliance schedule and reporting requirements	11/17/76	Pending-Adm. Law Judge recommended \$225,000 penalty	Philadelphia
<u>Region VI</u>						
	Shell Oil Co.	Permittee	Dumping outside site	3/25/77	Notice and Final Order issued 3/25/77; no penalty assessed	Galveston
<u>Region IX</u>						
	Bethlehem Steel Corp, Crowley Maritime Corp, tug Seawolf	USCG	Dumping outside site	3/29/77	\$7,000 penalty paid 7/15/77	Dredged Material site

as needed. Assessments of available data on the dumpsites will be completed during 1978, and surveys will be conducted as necessary. The surveys conducted under this contract will supplement those surveys being conducted by NOAA and EPA Regional staffs.

A brief synopsis follows of each baseline survey presently being conducted.

Sewage Sludge Dump Site in the New York Bight

Sewage sludge from the New York-New Jersey metropolitan area is currently being dumped at a site approximately twelve miles from shore. While no impact on the shores has yet been detected in EPA and NOAA studies from sludge dumped at this site, improved sewage treatment in the New York-New Jersey metropolitan area will result in greater volumes of sludge to be disposed of during the next few years. Much of this sludge may have to be ocean dumped at this site as an interim measure until an alternative form of ultimate disposal is selected and implemented.

In early 1974, EPA requested NOAA to recommend other areas in the New York Bight for study as alternate sludge dumping sites. NOAA recommended two areas, one north and one south of the Hudson Canyon. EPA has completed studies, by contract, of the north area located about 60 miles from shore. The first survey was conducted during September and October 1974; the second during January and February 1975; and the third survey during July and August 1975.

EPA also supported NOAA studies on other parts of the New York Bight and used the results of these studies, as well as its own, to prepare an EIS on ocean dumping of sewage sludge in the New York Bight. The Draft EIS was made available for public comment in February 1976. The conclusions reached in the Draft EIS were that dumping should continue at the existing site, that a comprehensive monitoring program should be maintained for the existing site, and that the alternate site should be designated for use when and if the monitoring program indicates that the existing site can no longer safely accommodate sewage sludge. Publication of this EIS in final form was delayed pending a decision on relocating all sludge dumping sites. Now that a decision on this issue has been reached, steps are being taken to implement the conclusions reached in the EIS. For example, in August 1976, Region II included the development and implementation of a permittee monitoring program as a condition in all new sludge permits. This permittee monitoring program was

Mixed Industrial Wastes Dump Site, East of Cape Henlopen,
Delaware. ("106" site)

This dumpsite is located 106 nautical miles southeast of Ambrose Light (at the entrance to New York Harbor) and approximately 90 nautical miles due east of Cape May, New Jersey. The site is off the continental shelf at depths ranging from 1,550 meters (m.) in the northwest corner of the site to 2,750 m. in the relatively flat southeast corner. The bottom is generally characterized by a rugged topography. A major topographic feature of the region, the Hudson Canyon, is to the north, northeast, and east of the dump site.

This site was used in 1977 by 12 different permittees located in New Jersey, Delaware and Pennsylvania for the disposal of industrial chemicals and by the City of Camden for the disposal of sewage sludge.

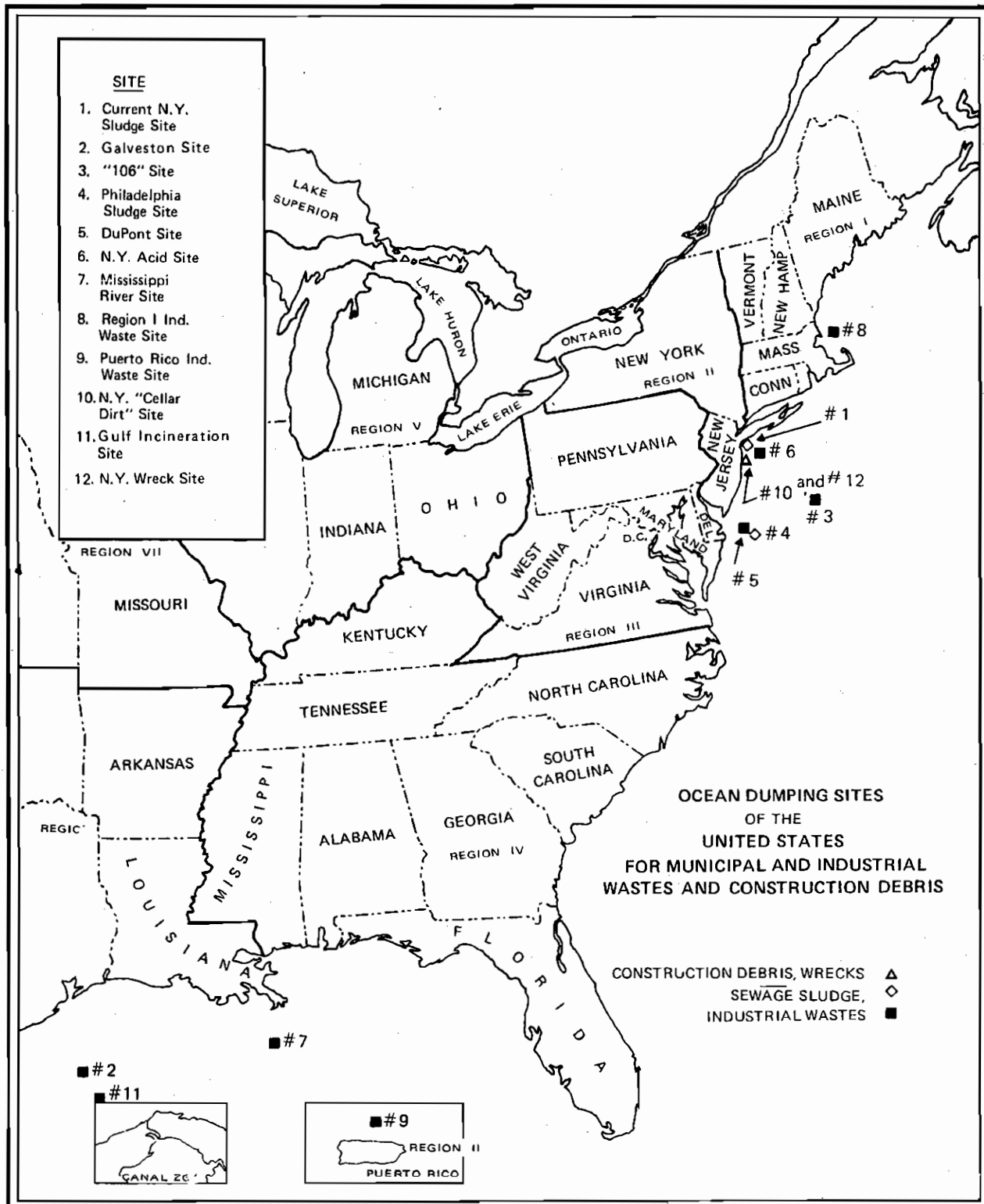
Typical waste materials include water solutions of inorganic salts with trace amounts of organic materials, liquid wastes from manufacture of non-persistent organophosphate pesticides, residual sludges and liquid wastes from the manufacture of pharmaceuticals and similar materials resulting from diverse manufacturing processes. Containerized radioactive wastes were dumped in a location just south of the present site years ago prior to enactment of the MPRSA, but the dumping ceased under a self-imposed moratorium by the then Atomic Energy Commission.

In May 1974, NOAA began a series of baseline surveys of the 106 dump site in cooperation with EPA, the Virginia Institute of Marine Sciences, the Woods Hole Oceanographic Institution, the Lamont-Doherty Geological Observatory of Columbia University, and the Smithsonian Institution.

Additional cruises were conducted in 1975, 1976, and 1977. Some of these cruises made use of the manned submersible ALVIN, and data were also collected during some cruises at the radioactive waste dumping area south of the dump site.

The hydrography of the dump site area is complex and the currents are seasonally variable. Any one of three water masses may be present at different times or at different levels in the water column; shelf, slope, and Gulf Stream water have all been identified. Circulation patterns are affected by mixing across frontal zones. Currents run predominantly southward along the coast, while the Gulf Stream runs generally northeastward.

1. Current N.Y. Sludge Site
2. Galveston Site
3. "106" Site
4. Philadelphia Sludge Site
5. DuPont Site
6. N.Y. Acid Site
7. Mississippi River Site
8. Region I Ind. Waste Site
9. Puerto Rico Ind. Waste Site
10. N.Y. "Cellar Dirt" Site
11. Gulf Incineration Site
12. N.Y. Wreck Site



INCINERATION AT SEA

Destruction of combustible wastes by incineration at sea has become recognized as a viable alternative to some methods of land-based incineration and to the direct dumping of certain materials into the marine environment. This disposal technique employs vessels that have been specially designed and equipped with on-board incinerators. The liquid waste to be incinerated is pumped into a series of cargo tanks on the vessel and transported to a designated ocean disposal site where, under carefully controlled conditions, the waste is fed into the on-board incinerators and burned at temperatures exceeding 1250°C.

The Motor Tanker (M T) Vulcanus, owned by Ocean Combustion Services, B.V., of The Netherlands, is one vessel as described. For two years, prior to coming to the U.S. in September 1974, the ship had been incinerating chemical wastes in the North Sea for companies located in Europe. The high-temperature incinerators on board the Vulcanus are designed to oxidize upwards of 99.9 percent of organochlorine wastes. The resulting emissions primarily consist of hydrogen chloride, carbon dioxide and water, which are discharged directly into the atmosphere without scrubbing.

During 1974 EPA determined that the Marine Protection, Research, and Sanctuaries Act would apply to incineration at sea, thereby requiring a permit under the Act. Shell Chemical Company requested a permit to incinerate at sea 16,800 Metric Tons (MT) of organochlorine wastes. EPA granted a Research Permit on October 10, 1974, for the destruction of 4,200 MT of the wastes.

This first U.S.-sanctioned incineration at sea project took place on board the M/T Vulcanus during October 20-28, 1974. The designated disposal site was in the Gulf of Mexico, about 241 kilometers (130 nautical miles) from the nearest land. Specific conditions of the permit required substantial monitoring to determine the feasibility of this disposal technique and the impact of the resulting emissions on the marine environment. Review and analysis of the large amount of data gathered during the incineration operations concluded that the conditions and criteria of the permit had been met and there had been no significant adverse impact on the environment.

Detailed information on the project and recommendations concerning crew safety, communications and operations coordination are contained in the EPA report, "At Sea Incineration of Organ-chlorine Wastes Onboard the M/T Vulcanus," published in December 1977.

In January 1975, the U.S. Air Force applied for a permit to incinerate at sea two stockpiles (2.3 million gallons) of Herbicide Orange which were being stored at Gulfport, Mississippi, and on Johnston Island, a small Pacific atoll 800 miles west of Hawaii.

Public hearings on the permit application were held on April 25 and 28, 1975. As a result of the information presented, EPA requested the Air Force to explore the feasibility of a proposed alternative to incineration--a method of reprocessing the herbicide into an acceptable commercial product. Final action on the permit application was to be delayed until results of the feasibility study were reviewed.

In March 1977, the Air Force presented a report on the reprocessing alternative and concluded that it was not a feasible alternative because more technology is needed to develop methods to destroy the residual dioxin that result from the reprocessing method. The Air Force then requested that EPA reconvene the hearings to further consider their permit application for incineration at sea.

At the third hearing (April 7, 1977) the following conclusions and conditions were decided:

1. Issue a Research Permit for an initial incineration of 4,200 metric tons (one shipload) of Herbicide Orange at an EPA designated site in the Pacific Ocean 120 miles west of Johnston Island.
2. Require detailed monitoring of the initial research burn, the dedrumming/transfer activities, and temporary storage of the drums.
3. Provide for EPA review and analysis of the data obtained during the initial burn and make the data available to the public.

Third burn began	Aug. 24, 1977
Total stocks of Herbicide Orange incinerated	Sept. 3, 1977
Diesel fuel rinse burn; project completed	Sept. 8, 1977

The scope of activities for this effort included design and preparation of the stack sampling and monitoring equipment, preparation of a comprehensive safety plan, development of a sampling and analysis protocol, acquisition of samples and monitoring of stack emissions during incinerator operation, as well as analyses of these samples followed by evaluation of the results. These details and plans were developed and carried out through joint efforts of EPA, USAF, USCG and the Military Sealift Command.

Total elapsed time for the three burns was approximately 714 hours, during which 11,011 MT of the wastes were burned, giving an average rate of 15.4 MT per hour. The incinerator temperatures were consistently uniform and comparable; the average flame temperature was 1500 C. Monitoring indicated that combustion efficiencies and destruction efficiencies of the herbicide components were in excess of 99.99 percent, that there were no adverse impacts on the personnel or the environment, and that requirements of the EPA permits were met.

An EPA report describing the project in detail is being prepared and will be published in 1978.

Section 1008 of the RCRA provides for the development of guidelines that "describe levels of performance, including appropriate methods and degrees of control that provide at a minimum for... protection of public health and welfare...." Guidelines have been initially planned to cover landfilling, landspreading, and surface impoundments for all solid wastes, including municipal sludge.

As part of the construction grants program authorized by Title II of the CWA, technical guidance on municipal wastewater treatment sludge management has been developed and published to assist in implementation of the program. A technical bulletin, "Municipal Sludge: Environmental Factors," has been issued. This technical bulletin was developed to provide guidance to State and Regional construction grant personnel and to present information on sludge management options to designers, municipal engineers and others involved with wastewater treatment. Guidance on costs and heavy metal effects on plants and animals from agricultural application of sludge has also been published. Additional technical reports supplementing the bulletin are planned.

Following from and in accordance with the regulations developed under Section 405(d) of the CWA for the giveaway or sale of sludge, a home use bulletin will be published for wide distribution to homeowners and other small consumers. However, it is important to point out that the rulemaking process is neither a simple nor an independent one. The development of effective regulations and guidelines, for example, requires a strong research, development and demonstration base, and the implementation of regulations generally requires some technical and/or financial assistance.

Guidelines and regulations issued under both the CWA and the RCRA relating to land application and landfilling will go a long way towards closing the gap that has existed in the disposal media for sludge. Further rulemaking under the CWA (e. g., covering the giveaway and sale of sludge) will fill any remaining holes in sludge utilization and disposal regulatory policy, thereby helping to assure to the fullest extent that both the environment and public health are protected from harmful and potentially harmful effects of unacceptable municipal sludge management practices.

Of equal (and great) importance are efforts under the CWA to require pretreatment of industrial wastes that enter publicly owned wastewater treatment plants. Implementation of these regulations will render a high percentage of wastewater treatment sludges acceptable for resource conservation and recovery programs.

December 31, 1981. Final phase out dates vary for each permittee based upon the individual permit implementation schedule. Each of these permittees is on a strict implementation schedule and closely monitored by the appropriate Region. All permittees are afforded the opportunity to comply with this condition using 201 Construction Grant funding, and most have chosen this path. Examples of some of the technology being considered in the Facility Plans (Step 1 Grant) or currently being implemented are:

Camden)	
Middletown Township)	composting
Northeast Monmouth)	
Linden-Roselle)	
Nassau County)	
 Bergen County)	 composting and use as landfill cover as an interim solution; co-recovery with solid wastes as a long-term solution
 Joint Meeting of Essex and Union Counties))	
Rahway Valley)	
Wayne Township)	incineration
Lincoln Park)	
Pequannock Township)	
Pompton Plains)	
Oakland)	
 Middlesex County		 multiple hearth incineration or starved air combustion
 Glen Cove		 co-incineration with solid wastes
 New York City		 composting or landfilling of digested dewatered sludge as an interim solution; utilization of other technology, (pyrolysis, co-recovery, etc.) or shipment out of the city area or composting as a long-term solution.
 Westchester County		 use of existing excess capacity in solid waste incinerators and composting of remainder

violations of the ambient air quality standards, and new facilities must meet EPA standards as defined by New Source Performance Standards for Sludge Incinerators (40 CFR 60.15).

An extremely important consideration is the energy requirement for sludge incineration. Without sufficient dewatering to allow self-sustaining combustion, a considerable amount of auxiliary fossil fuel or electricity is needed to dry and incinerate the sludge. This need accounts in part for the high cost of the process, which is likely to increase further as energy prices rise. However, it has been demonstrated that municipal solid waste can be utilized to provide the necessary energy (co-incineration).

2. Starved-Air Combustion (Pyrolysis)

Starved-air combustion, sometimes referred to as pyrolysis, is similar to incineration in that it partially decomposes the sludge to an ash and a gas in the presence of heat. In contrast, this method of sludge destruction is performed in a low-oxygen or reducing atmosphere. If the sludge is dry enough, starved-air combustion is a self-sustaining reaction which requires less input of energy and produces a gas that has low BTU value.

A pilot plant research program with a modified multiple hearth, operating in a starved-air mode, was evaluated on representative sewage sludges from the New York-New Jersey metropolitan area. The conclusion was that the technology is a feasible option to sludge management. Full scale demonstration projects are now needed to support the findings of the pilot project.

Processes to recover energy from sludge either by incineration or starved-air combustion (with or without municipal solid waste) are now under consideration in a number of communities. (In addition, several European plants have been operational for many years.) These methods offer the advantage of recovering energy resources while at the same time reducing sludge volume.

3. Surface Land Application

Application of liquid or dewatered sludge directly to the land is a recycling method of disposal frequently used as a means of fertilizing and renewing soil for growing crops and for reclaiming strip mines and other disturbed land areas. The potential for adverse impact from sludge landspreading practices can be minimized through stabilization and proper site run-off management, pretreatment of industrial wastewaters, sludge application rate, soil pH, and system monitoring.

It is important to point out that the groundwater impacts from sludge landfilling practices are not dissimilar to those that may be expected from municipal solid waste landfilling practices, except that those from the former would likely result in greater heavy metal concentrations in the leachate.

Technologies for the control of leachate from landfills have not been applied on a wide scale basis across the nation, although specific cases exist where results have been quite positive. The most common technology involves lining the landfill site, and collecting and treating the leachate.

the sea. The objective is to identify toxic material whose disposal might result in the trophic or physical transport of pollutants beyond the dump site. Substantial interspecific differences were found between five test species. A bivalve mollusk was found to be the least sensitive species tested and an amphipod crustacean the most sensitive. This was carried out as part of the EPA/COE methods manual for implementation of Section 103.

Analyses of Water and Sediment at the Duwamish Waterways Disposal Site

Dredged sediments were deposited at a controlled experimental dumpsite. Results were obtained by monitoring physical and chemical parameters in the water column and sediments were evaluated to gain insight regarding the effects of dredged material disposal to open marine waters. Long-term sampling was also accomplished for water quality, sediment size distribution, and concentrations of interstitial chemical components. This research was performed as part of the COE Dredged Materials Research Project.

Influence of Sewage Sludge and Dredged Material Disposal on Trace Metal Assimilation by Organisms

This research effort assessed the sediment water exchange rates of metals and nutrients in clean and polluted sediments and studied the influence of bioturbation on the exchange rates. Methods to measure these rates at disposal sites were investigated. Initial results, from measurements of sediments, interstitial, and over-lying water reveal that organic leaching rates may control the rate at which metal species become available. In highly polluted areas metals tend to be retained as sulfides, whereas sulfates would exist in less polluted areas where higher oxygen levels prevail. This work is now completed and a report is in preparation.

Determination of Organism Response to Burial By Dredged Material

A bioassay for evaluating the effects of dumping dredged materials will be developed. A "microcosm" of benthic invertebrates is established in a container with sediment from its habitat. The purpose is to determine the survival of the component species following burial under various depths of introduced material. Tests will be made with (1) natural sediment, (2) sediment of different particle size, and (3) polluted sediment. Results of these experiments will be correlated with data from past and ongoing dredged material studies.

advance knowledge of the behavior of toxic metals at the critical fresh water/salt water interface in an urbanized estuarine system. This project is now complete and a final report is in preparation.

Environmental Monitoring Using Molluscan Shell-Growth and Life History Data

The project focuses on the development of a manual of techniques describing methods for extracting molluscan life history data from shell structures or death assemblages. Demonstration of shell growth techniques as an indicator of environmental stress has been made at the Brenton Reef, R.I., dredged material site using the bivalve, *Arctica islandica*. Population statistics of several short-lived species will be examined at the New Haven, Conn., dredged material site. The techniques and illustrations will substantially aid our ability to assess long-term impact on marine benthic populations exposed to contaminated sediments. Technique development is complete and field application is underway.

Analysis of Statistical Methods Used to Determine Effects of Pollutants on Aquatic Populations

The final phase of this project will be devoted to analysis and comparison of 4-5 years of field data in two bay systems of northern Florida. Spatial and temporal parameters will be assessed in several ways to determine the impact of single sources of pollution or otherwise unaffected off-shore areas. This study will provide information on the reaction of coastal systems when pollution abatement has been executed.

Biological Analysis of Primary Productivity and Related Processes in New York Harbor as Reflective of Changing Water Quality

The objectives of this four year study of New York Harbor and adjacent waters are: (1) to provide information relevant to the kinds of treatment necessary for municipal waste discharge into coastal waters and how the various treatments might influence water quality, including how changes in water quality may lead to massive algal blooms (noxious and/or toxic) in these waters; (2) to determine whether the quality of waters in New York Harbor is being affected or would be affected by materials flowing into the area from the current offshore sludge dumping sites or from proposed alternate sites and how the toxicity of these materials to the primary producers is reflective of changing water quality; (3) to construct a dynamic and predictive model system to be used in the economic, sociological, and scientific planning for the future development of water resources in this area.

